THE ADVOCATE OF SCIENCE.

Vol. 1.] KNOWLEDGE IS POWER—HAPPINESS—VIRTUE. [Nos. 23 & 24.

Wm. P. Gibbons, S. W. cor. of 6th and Cherry sts — PHILADELPHIA, EIGHTH MONTH 29, 1833. — Semi-monthly.—One dollar for 50 Numbers

For the Advocate of Science.

GEOLOGY, No. 14.

Recapitulation.—In my last number, I described *basaltic* and *trap* rocks. Basalt is composed chiefly of *hornblend*—often forms the substance of dykes—occurs in the form of columns, also globular, and amorphous or shapeless—forms the Giant's causeway, and the cave of Fingal—not met with in the United States—proofs of its igneous origin. The formation of dykes supposed from beneath. Trap rocks allied to basalt—form steps in breaking—found on the Hudson, Schuylkill and Brandywine. *Porphyry* and *greenstone* also belong to the same class; all supposed to have been formed by fire. I will now proceed to the consideration of volcanoes and volcanic rocks.

Superstitions founded on volcanoes.—The phenomena of earthquakes and volcanoes are well calculated to excite the attention of the most barbarous nations, some of which consider volcanic craters as the residence of demons, and their eruptions as malignant and vindictive inflictions on the inhabitants of the earth. The natives of Owhyhee ascribe them to the dominion of a goddess whom they name *Pele*. The poetry of the ancient Greeks and Romans attributed the earthquakes of Italy to the struggles of the Titans, a race of giants who aspired to dominion in heaven, and whom the offended gods punished for their ambition by burying them alive beneath the volcanic mountains. According to some of the fabulous narratives, Ætna and the neighboring volcanic islands, were occupied by the blacksmith, Vulcan, and his Cyclops, as furnaces in which to forge their thunderbolts.

Connexion between volcanoes and earthquakes.—I need not expatiate on the connexion that exists between earthquakes and volcanoes. That they are intimately related to each other, and dependent on the same causes, no one is ignorant.

Their phenomena described.—The volcanic eruption is commonly announced by loud reports, as of fire arms, a peculiar stillness of the atmosphere, and a heavy rumbling noise in the earth. Springs and wells are apt to become dry at the same time. The subterranean commotion soon finds a vent at the crater. Fragments of rocks are projected, together with immense clouds of dust and smoke, which darken the surrounding air. Electrical action is observed in these clouds, in the form of vivid flashes of lightning, and often a heavy fall of rain ensues. At length the melted rock or lava rises to the edge of the crater, or breaks out at the side of the burning mountain, and pours itself over the valley beneath, bearing destruction in its course. A crisis now takes place, and the volcano is gradually extinguished, to remain in a state of quiescence for an indefinite period of time.

Number and magnitude of ancient volcanoes.—The remains of ancient volcanoes, long since dormant, which abound in many places, indicate that the operations of subterranean fire were once carried on to a much greater extent than they have been within the period embraced by history. Between Naples and Cumea, in a space of twenty miles in length and ten in breadth, there are no less than sixty craters, all perfectly quiescent, and some of them larger than Vesuvius. Many of the islands of the Grecian Archipelago are volcanic. The city of Cumea, founded three thousand years since, is built in the crater of an ancient volcano. It is said the former crater of Teneriffe contains twelve square leagues of surface. The whole of the Canary Islands may be regarded as so many chimnies to a vast subterranean volcano, which finds vent sometimes by one and sometimes by another.

Valley of Auvergne in France.—There is a district of country near the mouth of the Rhone, fifty leagues across, which for a long time was a subject of dispute with regard to its origin—whether the rocks on its surface and for a considerable depth beneath, are the result of aqueous deposition, or were once ejected in the state of fusion from adjacent volcanoes. But this question is now considered as determined. Several of the disciples of Werner have been cured of their scepticism respecting the operation of fire in that wide region of country, by personally visiting the spot. It is by some suspected that Werner, the father of practical Geology, and the able patron and champion of the aqueous theory, purposely declined an examination of the Valley of Auvergne, against repeated solicitations, lest he should be constrained to renounce those favorite notions which he had been so earnestly engaged in teaching. It is now conceded by writers in general, that this valley, containing twenty thousand square miles, was once deeply covered with liquid fire, and that the sunny skies of France were once darkened with immense clouds of smoke and dust, expelled from the burning mountains in the vicinity. So forcibly does the view of this place impress on the mind the idea of its supposed origin, that the inhabitants style it the "Valley of Hell."

Number of active volcanoes.—The number of volcanoes from time to time liable to be awakened into activity, is estimated at two hundred, a large proportion of which is in South America. Among the few that are in continual action may be mentioned one in Nicaragua island, called by sailors the "Devil's mouth," and that of Stromboli, in the Lipari islands, which has been raging for at least two thousand years, unceasingly pouring forth volumes of ashes and red hot stones.

Situation of the South American volcanoes.—The volcanoes of South America are arranged in rows parallel to the ocean, and probably situated on the summit of a vast subterranean chasm stretching along the western coast of the continent.

Mud volcanoes of Peru.—Many of the American volcanoes, and some of those in Europe, are never known to emit flame, but pour forth torrents of water mixed with mud and stones. In 1698, an eruption of this kind from Carguairazo, in Peru, deluged with mud and slime about eighteen square miles of the adjoining fertile country. So many of the inhabitants were destroyed, that their bodies were afterwards buried in heaps. In 1797, within one year of a century afterwards, a similar terrific catastrophe occurred in the same mountain, by which forty thousand of the inhabitants were swallowed up in an ocean of boiling water and mud.

Mud volcanoes in Sicily.—In 1777, the volcano of Macaluba, in Sicily, projected an immense column of mud, to the height of an hundred feet, which assumed, at top, the appearance of a large tree. It is not unusual for fish to be discovered in the liquid thus emitted, ready cooked for eating.

Volcanoes of the Azores, Java &c.—In the Azores, there are no less than forty-two active and dormant volcanoes, and in the island of Java alone there are thirty-eight large volcanic mountains, some of which are at present in an active state. In Kamschatka, Greenland and Iceland, they are numerous.

Sinking in of volcanic mountains.—There are instances of volcanoes having been completely engulphed in chasms beneath them. That of Pic, in the island of Timor, one of the Moluccas, for a long time served as a prodigious watch light, that was seen on the sea at the distance of three hundred miles. But in the year 1638, the mountain entirely disappeared during a violent eruption, and a deep lake now occupies its place. One of the largest volcanoes in the island of Java was thus swallowed up in the year 1772. On the 11th of August, near midnight, an uncommonly luminous cloud enveloped the mountain, which so alarmed the inhabitants of the surrounding country that they took to flight. But before they could all save themselves the mountain began to give way, and the greater part of it actually sunk and disappeared, its place being supplied by a flat, broken surface. A tremendous noise, resembling the discharge of the heaviest cannon, attended the occurrence. An extent of ground fifteen miles long and six broad was swallowed up, and with it forty villages, and 3000 of the inhabitants. The heat of the newly formed surface was so great, that six weeks afterwards, it was impossible to approach the place.

Sinking of the city of Euphemia.—In violent earthquakes the chasms are so extensive that large cities have in a moment sunk down and for ever disappeared, leaving a lake of water in their place. Such was the fate of Euphemia, in Calabria, in 1638, the narrative of which, written by Kircher, is familiar to my readers. Upon landing on the neighboring shore, "Here," says he, "scenes of ruin every where appeared around me; but my attention was quickly turned from more remote to contiguous danger, by a deep rumbling sound which every moment grew louder and louder. The place where we stood shook most dreadfully. After some time, the violent paroxysm ceasing, I stood up and turning my eyes to look for Euphemia, saw only a frightful black cloud that overhung and enveloped the place. We waited till it had passed away, when nothing but a dismal and putrid lake was to be seen where that beautiful city had just stood."

Formation of islands by submarine volcanoes.—Volcanoes frequently take place beneath the sea, and give rise to new islands. The eruption produces a violent boiling and agitation of the water, accompanied by the discharge of volumes of gas and vapor, which take fire and roll in sheets of flame over the surface of the waves. Masses of rock are darted through the water, and accumulate together with the lava, so as to reach above the surface of the sea. The land thus formed however appears to be very unstable. In 1783, a submarine volcano broke out near Iceland, and formed a new island, which after burning furiously for several months, entirely disappeared. In 1720, an island of nine miles in circuit rose during the night after an earthquake in the Azores, and subsequently sunk to a level with the sea. In 1757, eighteen small islands appeared near the same place, at the termination of a violent earthquake, and gradually subsided into the ocean. In 1707, a considerable addition was made to the island of St. Erini, in the Mediterranean, from a similar cause, and since that time the same island has been enlarged at three different periods, by volcanic eruptions. These new productions of land do not appear to have shared the fate of most volcanic islands.

Submarine origin of pumice.—Immense quantities of pumice are sometimes thrown up by submarine volcanoes. It has been seen floating upon the sea over a space of 300 miles, at a great distance from any known volcano; and hence the inference that volcanoes sometimes break out at such a vast depth beneath the surface of the ocean that none of their products reach the surface except such as float in water.

A mountain of pumice.—The island of Lipari contains a mountain entirely formed of white pumice, which at a distance appears to be covered with snow. From this locality most of the pumice of commerce is procured.

In my next number, I will conclude this interesting portion of my subject.

S.

For the Advocate of Science.

ON THE INSTINCT OF PLANTS.—*Concluded from page* 82.

Having detailed some of the leading facts, that are adduced to support the analogy between animal and vegetable life, I will next explain, in a few words, the theory inferred therefrom, premising an explanation of the terms *irritability* and *sensibility*.

Irritability is that principle of the living fibre, which enables it to contract when acted upon by any mechanical agent. By virtue of irritability, the muscles of a limb will contract for some time after the limb is severed from the body. *Sensibility* implies the existence of a *sensorium commune*, or brain and nervous system, and enables the organized body to *perceive* the impression of a stimulating agent, and to feel pleasure or pain therefrom. Thus if a sharp instrument penetrate my arm, pain, and the contraction of the injured muscular fibres are the consequences. The former is owing to sensibility, and the latter to irritability. But when I feel the pain, and owing to this pain, withdraw my arm from the offending cause, *sensibility* is called into action. If my arm were detached from the body, the muscles would still contract for a time, when wounded, owing to their *irritability*; but their connexion with the brain being destroyed, *sensibility* cannot be exercised, and of course no *pain* could be felt.

Now in the case of the mimosa and other sensitive plants, Darwin supposes that an impression upon the leaf is conveyed to the sensorium or brain, located in the bud, to which the leaf is connected. The sensation of pain is thus experienced, and the fibres of the leaf are then called into contraction to close it and protect it from injury. When a drop of sulphuric acid was placed upon the bud, the same effect was produced, "as soon as the brain of the bud might be supposed to be destroyed." This theory likewise accounts for the other phenomena enumerated by requiring the exercise of *sensibility*. "Vegetable life," says the author of Phytologia, "seems to possess an organ of sense to distinguish the variations of heat—another to distinguish the varying degrees of moisture—another of light—another of touch—and probably another analagous to our sense of smell. To these must be added the indubitable evidence of their passion of love, and of their necessity to sleep.

It is not necessary to enter minutely into an examination of the arguments by which our poetic author arrives at his singular conclusions. I will only observe that the entire destruction of the brain by the acid, is supposed to have the same effect as the action of the brain consequent to the perception of an injury inflicted upon any part of the leaf; or, that when the brain is destroyed, the same provision is made for the protection of the leaf, as when the leaf itself is injured; and further, that the existence of a single brain for the benefit of the whole plant, admits of the same proof, as that every leaf has its particular brain in the bud.

The operation of the principle of *irritability*, is extensive enough, in my opinion, to account for all the motive phenomena of vegetable life. But we must bear in mind, that this principle may be, and doubtless is, very different in its effects upon the vegetable fibre and upon the animal muscle. As far as the observation of experimentors has extended, the muscles of animals are called into lively action by means of the galvanic fluid. But in all the experiments that have been made upon vegetables, no contraction could be perceived on the application of galvanism, except in a few instances reported by Fahn; but his accounts are so vague and imperfect that writers are mostly unwilling to place any reliance upon them. Indeed we know, that even in the animal frame, irritability, or at least the power of contraction is not, of necessity, connected with muscular fibres: for these have never been detected in the skin, which, nevertheless, is evidently contractible.

The most prominent argument of Dr. Darwin, he deduces from the contraction of vegetable fibres owing to the *absence* of certain stimuli, as of heat and light; which he supposes is impossible unless sensation be produced. Admitting that animal and vegetable life are governed by the same laws, this were a more formidable argument. But until the identity of their laws is established it rests upon mere supposition.

It were almost enough for the demolition of a theory at the present day, to name Darwin as its author; so peculiarly unfortunate was that writer in his speculative views. The world will long be indebted to him for his diligent researches, and accurate observations. And perhaps his name will hold a more exalted place on the scale of science, when the lapse of another century shall have covered more deeply in oblivion his romantic theories.

Let us now examine if the principle of irritability is sufficient to account for those curious and interesting operations, a sketch of which has just been given. "In irritation, the stimulated muscles only are brought into action, without being perceived by the other parts of the system" We have no evidence that any other than the irritated portion of the plant is called into action, in the case of the Asclepias and Apocynum, whose flowers entrap flies and other insects—the Sarracenia and Muscipula, whose leaves have the same effect—and the stamens and pointals, whose motions are admitted to be in consequence of some physical impression of the one upon the other. It is true that the effect of an injury inflicted upon the mimosa, is perceived in very distant parts of the plant; but even here, all the contractions proceed from the irritated point, and extend to other parts in proportion as the injury is severe.—On the contrary if there exist a brain for the whole plant, to which sensation is referred, why do we not observe the effects of a severe injury to appear simultaneously in several parts of the plant? That contraction takes place from defect of stimulus, the sleep of plants is not sufficient evidence, for supposing the existence of two sets of fibres that act in opposition to each other, the stimulus of light will enable the fibres of one set to act, and expand the leaf by overcom-

ing the antagonizing fibres; and when this stimulus is withdrawn; those which close the leaf are able, in their turn, to gain the ascendency.

The most enthusiastic advocates of opposing theories are continually falling into absurdities. Descartes construed vital actions into mechanical operations, and Darwin saw in physical effects, the exercise of vital and even of mental energies. So far did each extend his favorite theory, that they brought the extremes to agree in one respect—in their absurdity. Descartes considered brutes as mere mechanical machines; with neither ideas nor sensation neither pain nor pleasure; and that their outcries under punishment and their alacrity in pursuing an enemy or devouring a meal, are produced by the same sort of power, which, exerted upon the different keys of an organ, compels itsrespective pipes to give forth different sounds. "Yet, in spite of all the philosophy in the world," says the eloquent Dr. Good. "the coachman, up to this hour, has whipped, and will yet continue to whip his horses, the huntsman to halloo to his hounds, and the bird trainer to sing or whistle to his bulfinches; though if the whole were mere mechanical machines, they might as well whip the sands, halloo to the waves, and whistle to the winds."* Darwin conceived plants as well as animals, to be possessed of sensation and muscular fibres; "and as sensation is the result of a particular organ, and the organ producing it is connected with various others, he has at the same time liberally endowed them with a brain, a heart, and a stomach; and very obligingly permitted them to possess ideas, and the means of communicating ideas; to fall in love and to marry, and thus far to exercise the distinctive faculty of volition."†

In deciding upon any question which has become the subject of discussion, it is generallly safe to mark out a medium path, between the most opposite combatants; although at the same time, this position is often the most difficult of tenure, on account of its exposure to assaults on the right hand and on the left. Thus, in the subject we have examined, whilst due consideration is paid to the laws and operations of life, we must not overlook the many phenomena that are stricly mechanical.

BOTANICUS.

*Good's Book of Nature, p. 229. †Ib p. 79.

HISTORY OF THE ART OF PRINTING.—*Continued from page* 83.

THE scribe began by preparing his parchment with a wide and handsome margin, which, together with the spaces for pages, paragraphs, columns and lines, was marked off with a square with great exactness. Each page was written with two columns, marked off by drawing a line between them, and with wide spaces between the lines. Capitals and particular words were emblazoned, by being written in letters of gold, or inks of brilliant and beautiful colors, strongly contrasting with the deep black of the body of the writing. The character, for a great number of centuries, was the Gothic black letter. Nothing could exceed the beauty of the manuscript of some favorite books in the libraries of opulent men, who affected to be choice in their books. Those, who have not seen some of the more beautiful of these manuscripts, can form on idea of the beauty, illumination, emblazoning and ornament of these laborious products. It may be doubted, if the most splendid efforts of the modern press could compete with some of them in point of beauty.

Under these circumstances, we may easily judge of the scarcity of books in the dark ages. Only a few princes, rich ecclesiastical establishments, or individuals of opulent fortunes, could afford to possess them at all. A complete bible, fairly written and emblazoned, would then have cost what would now be a competent fortune. In the ninth century, Albert, abbot of Gemblours, who was supposed to possess one of the most splendid libraries of the age, numbered a hundred and fifty volumes. Before the year 1300, the library of Oxford consisted of a few tracts, which, on account of their value, were kept chained in chests. At the commencement of the fourteenth century, there were four classics, Cicero, Ovid, Lucan and Bœthius, in the royal library of Paris, which, with books of devotion, constituted the whole establishment.

These facts are sufficient to establish the importance of the art of printing, which, finding books the expensive and almost unpurchasable luxuries of the rich, rendered them at once accessible to men of common fortunes, broadening their diffusion, until they became the air and water—the common heritage—of the whole reading community. But for this invention, monkish legends might still have been the favorite and prevalent reading of the day. But for this invention, the greater wealth, learning and power of the Catholic church would have enabled it, in human probability, forever to have stifled the reformation. But for this, the ancient Aristotelian philosophy would have been the system of the ascendant, and Newton would have had to recant his theory of the universe, as Galileo was compelled to do before him.

The art of printing brought in its train light, liberty, and free and full permission, and even encouragement to investigate and decide according to conviction. On its banner were mourning and lamentation, and wo to bigotry and tyranny, and every effort to intimidate and enslave the free born mind. In fact, we are compelled to place this grand invention at the head of all, that have ever been made in our world, as being not only of prodigious importance, as an unconnected discovery; but as enveloping the germ and bud of all subsequent discoveries. Without it, even the grand invention of alphabetic letters would have been, so to speak, an esoteric secret, of little use to the million, and without essential bearing upon the general diffusion of science.

The origin of even this discovery can hardly be claimed by Europe. The Chinese contend, that the art of printing was known, and practised by them at a period antecedent to our era. We have sufficiently authentic records to prove, that printing was in use in China in the sixth century. Sir George Staunton, whose means of information were most ample, informs us, that it was probably practised at a very early period of the empire. The following is their mode of printing. They first write, or draw a fair copy of the work to be printed. It is then given to the engraver, or more properly the carver, who glues the leaves of the manuscript upon a hard board, on which he retraces with a suitable instrument, the strokes of the writing, carves the characters in relief, and cuts down the intermediate parts of the wood. The beauty of the work depends, of course, on the person, who writes the copy. The adroitness of the carver is such, that he copies every stroke exactly, and the work is so neatly executed, that it is difficult to distinguish a printed from a written book. The board, thus engraved, contains characters for two pages. The printer then fixes it in a level position. Being provided with a hard and soft brush, he dips the hard one into the ink, and lays on the carved board enough to answer for four or five impressions, not inking for every impression, as we do. He then lays on the paper, and with the softer brush, he presses the paper on the board, by gently drawing the brush over it, a little increasing the pressure of his brush, at each new impression, until all the ink is taken up by the different impressions. In this way, one man is able to throw off several thousand copies in a day. Their ink is prepared with great care, and every thing that relates to the finishing and binding is completed with the singular ingenuity, strength and gaudiness, that belong to all their manual operations. The great impediment to the extensive utility of the art is found in the prodigious number of their characters, the whole number amounting to 120,000.

Admitting that printing was practised by other oriental nations, as the Japanese and Hindoos, from time immemorial, the immovably stationary condition of science, and all intellectual improvement in those countries prove, that the art, to be followed by its full results, must be practised by a people in all respects fitted to give it scope, and derive from it its natural fruits. The invention of printing, therefore, in Europe, in the fifteenth century, as to all its practical results upon the improvement and happiness of mankind ought to be considered a simple, original and unborrowed invention, the rather, as there is no reason to believe, that it was copied from any other people, or derived from any knowledge, that it had been practised elsewhere.

(*To be Continued.*)

Important discoveries in Magnetism.—Professor Kiel, of Jena, has made some important discoveries and improvements in the quality and use of the magnet. At a late meeting of the Royal Society, the Professor was introduced for the purpose of presenting to the notice of the Fellows some of his improved magnets of a very supe-

rior power, as well as explaining their efficacy in the cure of nervous diseases, and to which they have been very extensively and successfully applied by Dr. Kiel on the continent. It is evident from the very far superior degree of power possessed by Dr. Kiel's magnet, that he adopts some mode of accumulating an intensity of magnetic force, superior to any method known or adopted by English philosophers. A small lyre-shaped magnet, of which he is possessed, weighing but 5 lbs, is capable of sustaining a weight varying from 100 to 130 lbs. according to the state of the atmosphere; magnetism, as well as electricity, being greatly modified by atmospheric influence. This must be acknowledged to possess greater intensity of accumulation of magnetic force than any magnets of equal size hitherto known; whilst the Professor assures us that the power contained is permanent, even without the continuous contact of the bar. This magnet is also possessed of very singular properties of inducing chemical action, in reddening vegetable blues, accellerating crystallization &c. But the most surprising point connected with these magnets, is their singular efficacy, discovered by the Professor, in the cure of diseases connected with the nervous system, as in neuralgia, cephalalgia, &c. and in alleviating the worst symptoms of tic douloreux, epilepsy, paralysis, rheumatism, gout, spasm &c. In these complaints the most immediate relief is obtained; and (says Mr. Booth, the lecturer on chemistry) "from various instances of its efficacy in trials which I saw made at a public infirmary, I feel convinced that this discovery of a new branch of the healing art must shortly rank as a new era in the history of medicine. A most singular proof of the susceptibility of nervous sympathy to magnetic influence, was shown by the diminution of temperature induced through the course of a nerve by the application of the magnet, amounting to a painful sensation of cold, and sinking the thermometer to five or seven degrees, a fact which must be sufficient to convince the most sceptical or unprejudiced observers."—*London United Service Journal for July.*

REMARKABLE OCCURRENCE.

From the Ayr Observer, a Scotch paper.

On Thursday the 20th June, about 11 o'clock, A. M. while Mr. Montgomerie, banker in Irvine, and another gentleman, were engaged in fishing on the river Garnock, nearly opposite to where they were standing, a slight eruption took place in the current of the river, which they at first supposed to be occasioned by the leap of a salmon; but the gurgling motion which succeeded, led them to suppose that something serious had occurred, and that the river had broken into the coal mines which surrounded the place on which they stood. They immediately hastened forward to the nearest pit mouth, and stated their suspicions, which the pit head man was at first slow to believe, and it was only after Mr. Montgomerie had strongly remonstrated with him, that he at length prepared to avert the danger. By this time, however, the men below had heard the water rushing forward, and were making the best of their way to the bottom of the shaft; but before they reached it, several of them were up to their necks in water, and in two minutes more every one of them would have been drowned. Immediately on the whole of the men being got out of the pits, Mr. Dodds, the active manager of the works, assembled all his men at the cavity in the bed of the river, over which they placed a coal lighter, laden with such things as they thought calculated to stop the rush of the water, such as straw, whins, clay, &c.; all their efforts however proved unavailing, for the water continued to pour into the mines, without obstruction; producing comparatively very little agitation on the surface of the river, until the following day about three o'clock, when a tremendous large space broke down, which in a short time engulphed the whole body of the stream, leaving the bed of the river quite dry, for more than a mile on each side of the aperture, where there had previously been a depth of fully six feet. At this time the fish of the channel were seen leaping about in all directions. On the flowing of the tide, the depth of the water, betwixt the chasm and the sea, increased to about nine feet; then the desolation was awful! The long sweep and prodigious quantity of water rushing into the chasm at this time, made the sight impressive beyond description. Three men who were in a boat near the spot, had a very narrow escape from being sucked into the vortex, for no sooner had the men got out, than the boat was drawn down with fearful rapidity. The great body of water continued to pour down the chasm until the whole workings of the pits which extended for many miles, were completely filled; after which the river gradually assumed its natural appearance, and the water attained its ordinary level. At this time the pressure in the pits became so great, from the immense weight of water impelled into them, that the confined air, which had been forced back into the high workings, burst through the surface of the earth in a thousand places, and many acres of ground were to be seen all at once bubbling up, like a boiling cauldron. In some places the current was so impetuous as to form cavaties four or five feet in diameter, and produced a roaring noise like the escape of steam from an overcharged boiler. Immense quantities of sand and water were thrown up like showers of rain, during five hours; and in the course of a short time the whole of Bartonholm, Longford, Snodgrass, and Nethermains were laid under water, by which calamity from five to six hundred persons, men, women, and children have been deprived of employment. We are deeply grieved to learn, that by this unfortunate occurrence these extensive works have been injured to an extent which almost precludes the hope of their ever being restored to their former state.

THE ADVOCATE OF SCIENCE.

Eighth Month 29, 1833.

"ANONYMOUS" will accept of our warm thanks for his kind favor. We need no more flattering evidence of public satisfaction with our labors, than he has given. When we commenced the publication of this paper, it was but with six or eight subscribers; but we felt a confidence of success, from the circumstance that the path we selected was yet untrodden, and to facilitate the progress of science, and to direct general attention to the study, it was only necessary to present it in a popular and comprehensive form.

A half volume of the work is now nearly completed. We yet feel encouraged to pursue our object, by the steady accession of new subscribers. Many acknowledgments are due to our friends in different sections of the country, for their interest in our behalf; and while we render these, we still solicit a continuation of their friendly influence; for the permanent introduction of a scientific publication in the community, requires considerable effort—more than we can exert ourselves. Had our object been to make money, we would have selected a different course from that we now pursue, and one we know would have been more immediately successful. But utility was the primary object in view; and so far as our humble efforts could extend in promoting a wholesome reformation in the reading community,—in giving facts instead of romance, and telling of the works of nature instead of reciting fable we were willing to use them. As yet, our greatest satisfaction has been found in public approbation, and the only remuneration we have received, is a consciousness of working in a good cause.

FOSSIL SHELLS OF N. AMERICA.

IT gives us pleasure to announce the publication, by Judah Dobson, Chestnut street, of "*Fossil Shells of the Tertiary Formations of North America*, by T. A. CONRAD. No. 3."

This number contains descriptions of forty species of fossils from the single locality of Claiborne, in Alabama: the perfect preservation of these relics, and their astonishing variety and number, are truly surprising. The plates referred to in the present number are necessarily delayed until the publication of the fourth number, which will soon be ready for the press. Meanwhile the intelligent author is prosecuting his laborious researches in Alabama, collecting all the natural productions of that almost unexplored region, and adding a vast contribution to the stores of American Science.*

The *poetical effusion* sent us by "A Minstrel," can be obtained by the frothy author by calling at our office. We advise him to hunt up his common sense, and pay some deference to its admonitions.

* Geologists and others desirous of possessing a series of American tertiary fossils embracing about eighty species, correctly labelled, may obtain them of W. P. Gibbons, for the sum of fifteen dollars.

DR. GODMAN'S RAMBLES OF A NATURALIST.

(*Continued from page* 78.)

In moving along the borders of the stream, we may observe, where the sand or mud is fine and settled, a sort of mark or cutting, as if an edged instrument had been drawn along, so as to leave behind it a track or groove. At one end of this line, by digging a little into the mud with the hand, you will generally discover a shell of considerable size, which is tenanted by a molluscous animal of singular construction. On some occasions, when the mud is washed off from the shell, you will be delighted to observe the beautifully regular dark lines with which its greenish smooth surface is marked. Other species are found in the same situations, which, externally, are rough and inelegant, but within are ornamented to a most admirable degree, presenting a smooth surface of the richest pink, crimson, or purple, to which we have nothing of equal elegance to compare it. If the mere shells of these creatures be thus splendid, what shall we say of their internal structure, which, when examined by the microscope, offers a succession of wonders! The beautiful apparatus for respiration, formed of a network regularly arranged, of the most exquisitely delicate texture; the foot, or organ by which the shell is moved forward through the mud or water, composed of an expanded spongy extremity, capable of assuming various figures to suit particular purposes, and governed by several strong muscles that move it in different directions; the ovaries, filled with myriads, not of eggs, but of perfect shells, or complete little animals, which, though not larger than the point of a fine needle, yet when examined by the microscope, exhibit all the peculiarities of conformation that belong to the parent; the mouth, embraced by the nervous ganglion, which may be considered as the animal's brain; the stomach, surrounded by the various processes of the liver, and the strongly acting, but transparent heart, all excite admiration and gratify our curiosity. The puzzling question often presents itself to the inquirer, why so much elaborateness of construction, and such exquisite ornament as are common to most of these creatures, should be bestowed? Destined to pass their lives in and under the mud, possessed of no sense that we are acquainted with, except that of touch, what purpose can ornament serve in them? However much of vanity there may be in asking the question, there is no answer to be offered. We cannot suppose that the individuals have any power of admiring each other, and we know that the foot is the only part they protrude from their shell, and that the inside of the shell is covered by the membrane called the mantle. Similar remarks may be made relative to conchology at large: the most exquisitely beautiful forms, colors and ornaments are lavished upon genera and species which exist only at immense depths in the ocean, or buried in the mud; nor can any one form a satisfactory idea of the object the great Author of nature had in view in thus profusely beautifying creatures occupying so low a place in the scale of creation.

European naturalists have hitherto fallen into the strangest absurdities concerning the motion of the bivalved shells, which five minutes observation of nature would have served them to correct. Thus they describe the upper part of the shell as the *lower*, and the *hind* part as the front, and speak of them as moving along on their rounded convex surface, like a boat on its keel; instead of advancing with the edges or open part of the shell towards the earth. All these mistakes have been corrected, and the true mode of progression indicated from actual observation, by our fellow citizen, Isaac Lea, whose recently published communications to the American Philosophical Society, reflect the highest credit upon their author, who is a naturalist in the best sense of the term.

His sketch of the muskrat (Mus *Zibeticus*, Gm. Fiber *vulgaris*. Cuv.) is interesting, but he errs in saying this animal always has the entrance to its burrows under water. The habits of the muskrat are different in different sections of the country. In Canada, they construct in winter time, huts of earth on the ice in which several reside together, passing through a hole in the bottom, for the purpose of obtaining the roots of the calamus (Acorus *calamus*) on which they feed. Some suppose this plant to be instrumental in imparting to them their peculiar odor. Its manner of building has induced some authors to class it among the beaver tribe. Thus Linnæus calls it the Castor *zibeticus*. According to Mons. Sarrazin, it has a muscular power in its skin, which enables it to contract its body into a very small volume; and the suppleness of the false ribs also admitting contraction, enables it to pass through holes impervious to much smaller animals. A friend has kindly promised us a further history of this animal, which we will present to our readers.

As I wandered slowly along the borders of the run, towards a little wood, my attention was caught by a considerable collection of shells lying near an old stump. Many of these appeared to have been recently emptied of their contents, and others seemed to have long remained exposed to the weather. On most of them, at the thinnest part of the edge, a peculiar kind of fracture was obvious, and this seemed to be the work of an animal. A closer examination of the locality showed the footsteps of a quadruped which I readily believed to be the muskrat, more especially as upon examining the adjacent banks numerous traces of burrows were discoverable. It is not a little singular that this animal, unlike all others of the larger gnawers, as the beaver &c. appears to increase instead of diminishing with the increase of population. Whether it is that the dams and other works thrown up by men, afford more favorable situations for their multiplication, or their favorite food is found in greater abundance, they certainly are quite as numerous now, if not more so, than when the country was first discovered, and are to be found at this time almost within the limits of the city. By the construction of their teeth, as well as all the parts of the body, they are closely allied to the rat kind; though in size and some peculiarities of habit, they more closely approximate the beaver. They resemble the rat especially, in not being exclusively herbivorous, as is shown by their feeding on the unios or muscles above mentioned. To obtain this food, requires no small exertion of their strength; and they accomplish it by introducing the claws of their fore-paws between the two edges of the shell, and tearing it open by main force. Whoever has tried to force open one of these shells, containing a living animal, may form an idea of the effort made by the muskrat:—the strength of a strong man would be requisite to produce the same result in the same way.

The burrows of muskrats are very extensive, and consequently injurious to dykes and dams, meadow banks &c. The entrance is always under water, and thence sloping upwards above the level of the water, so that the muskrat has to dive in going in and out. These creatures are excellent divers and swimmers,* and being nocturnal are rarely seen unless by those who watch for them at night. Sometimes we alarm one near the mouth of the den, and he darts away across the water, near the bottom, marking his course by a turbid streak in the stream: occasionally we are made aware of the passage of one to some distance down the current in the same way; but in both cases the action is so rapidly performed, that we should scarcely imagine what was the cause, if not previously informed. Except by burrowing into and spoiling the banks, they are not productive of much evil, their food consisting principally of the roots of aquatic plants, in addition to shellfish. The musky odor, which gives rise to their common name, is caused by glandular organs placed near the tail, filled with a viscid and powerfully musky fluid, whose uses we know but little of, though it is thought to be intended as a guide by which these creatures may discover each other. This inference is strengthened by finding some such contrivance in different races of animals, in various modifications. A great number carry it in pouches similar to those just mentioned. Some, as the musk animal, have the pouch under the belly; the shrew has the glands on the side; the camel on the back of the neck; the crocodile under the throat &c. At least no other use has ever been assigned for this apparatus; and in all creatures possessing it, the arrangement seems to be adapted peculiarly to the habits of the animals. The crocodile, for instance, generally approaches the shore in such a manner, as to apply the neck and throat to the soil, while the hinder part of the body is under water. The glands under the throat leave the traces of his presence therefore, with ease, as they come in contact with the shore. The glandular apparatus on the back of the neck of the male camel, seems to have reference to the general elevation of the olfactory organs of the female; and the dorsal gland of the peccary, no doubt has some similar relation to the peculiarities of the race.

The value of the fur of the muskrat causes many of them to be destroyed, which is easily enough effected by means of a trap. This is a simple box, formed of rough boards nailed together, about three feet long, having an iron door, made of pointed bars opening *inwards*, at both ends of the box. This trap is placed with the end opposite to the entrance of a burrow observed during the day time. In the night when the muskrat sallies forth, he enters the box, instead of passing into the open air, and is drowned, as the box is quite filled with water. If the traps be visited and emptied during the night, two may be caught in each trap, as muskrats from other burrows may come to visit those where the traps are placed, and thus one be taken going in as well as on coming out. These animals are frequently very fat, and their flesh has a very wholesome appearance, and would probably prove good food. The musky odor, however, prejudices strongly against its use; and it is probable that the flesh is rank, as the muscles it feeds on are nauseous and bitter, and the roots which supply the rest of its food are generally unpleasant and acrid. Still we should not hesitate to partake of its flesh in case of necessity, especially if of a young animal, from which the musk bag had been removed immediately after it was killed.

In this vicinity, the muskrat does not build himself a house for the winter, as our fields and dykes are too often visited. But in other parts of the country where extensive marshes exist, and muskrats are abundant, they build very snug and substantial houses, quite as serviceable and ingenious as those of the beaver. They do not dam the water as the beaver, nor cut branches of trees to serve for the walls of their dwellings. They make it of mud and rushes, raising a cone two or three feet high, having the entrance on the south side under water. About the year 1804, I saw several of them in Worrell's marsh, near Chestertown, Marylaud, which were pointed out to me by an old black man who made his living principally by trapping

* Vid. M'Murtrie's Trans. Reg. Animal:—"They neither dive nor swim well." Its feet are not calculated for swimming.

these animals, for the sake of their skins. A few years since I visited the marshes, near the mouth of Magerthy river in Maryland, where I was informed by a resident, that the muskrats still built regularly every winter. Perhaps these quadrupeds are as numerous in the vicinity of Philadelphia as elsewhere, as I have never examined a stream of fresh water, dyked meadow, or milldam, hereabout, without seeing traces of vast numbers. Along all the water courses and meadows in Jersey, opposite Philadelphia, and in the meadows of the neck, below the navy yard, there must be large numbers of muskrats. Considering the value of the fur, and the ease and trifling expense at which they might be caught, I have often felt surprised that more of them are not taken, especially as we have so many poor men complaining of wanting something to do. By thinning the number of muskrats, a positive benefit would be conferred on the farmers and furriers, to say nothing of the profits to the individual.

(*To be Continued.*)

For the Advocate of Science.

The following Questions are respectfully submitted to the Advocate:—

Does the surface of a stream of water run faster than the basis?—If so what is the cause?

Is not a chain of three or more links, as liable to break as a chain of only one link drawing the same weight? QUÆSITOR.

Adams, Mass. Aug. 10.

For the Advocate of Science.

FRANKLIN'S FAMILIAR LETTERS.

Every thing connected with this great man, is an object of curiosity and interest. In the "Letters" &c. lately published, it is easy to discern his peculiar disposition, and his philosophic cast of mind. A number of them however are very trivial, being mere notes on affairs of no importance to the world at large, but nevertheless such as every man must attend to. These only serve to swell the book to a respectable size, without contributing much to the *substance* of it. Perhaps it would have been as well, or better, to have omitted them; it is hardly worth while to hunt out and publish every little common place note that a man ever wrote, merely because a great man wrote them. However, the volume is an interesting one, and displays the peculiar character of the man, more perhaps than any other publication existing.

The first letter in the collection exhibits the great change in the manners and customs of the people since that time. It was written to his sister who appears to have just been "coming out." "I have been thinking," says he, "what would be a suitable present for you: I had almost determined on a tea table; but when I considered that the character of a good housewife was far preferable to that of being only a pretty gentlewoman, I concluded to send you a *spinning wheel*, which I hope you will accept as a small token of my sincere love and affection." Many of our ladies of less note than the sister of Doctor Franklin, would feel themselves insulted by such a present.

One of the fashionable customs of the French ladies, is thus ridiculed in a letter to an English lady. Those of the sex among us who use *rouge* may learn from it a practical lesson:—

"As to rouge, they don't pretend to imitate nature in laying it on. There is no gradual diminution of the color, from the full bloom in the middle of the cheek to the faint tint near the sides, nor does it show itself differently in different faces. I have not had the honor of being at any lady's toilette to see how it is laid on, but I fancy I can tell you how it is or may be done. Cut a hole of three inches diameter in a piece of paper; place it on the side of your face in such a manner, as that the top of the hole may be just under the eye; then, with a brush dipped in the color, paint face and paper together; so when the paper is taken off, there will remain a round patch of red exactly the form of the hole."

Being requested by a lady to apologize for her not writing, he uses the following language, which might be adopted as a formula for many dilatory persons in the present day:—"The reasons of her not writing are, that her time all day is fully taken up, during the daylight, with the care of her family, and—lying abed in the morning. And her eyes are so bad, that she cannot see to write in the evening—for playing at cards."

The officious kindness of friends is well hit off in this phrase: "I pity my poor old sister, to be so harassed and driven about by the enemy; for I feel a little myself the inconvenience of being driven about *by my friends.*"

Being desired by some one to give advice to a young man under his charge, he replies in a style which no doubt harmonizes with the feelings of every body who has bestowed the same kind of favor on others: "As to my reproving and advising him, as you desire, he has not hitherto appeared to need it; which is lucky, as I am not fond of giving advice, having seldom seen it taken. An Italian poet, in his account of a voyage to the moon, tells us that '*all things lost on earth are treasured there;*'—on which somebody observed, there must then be in the moon a great deal of *good advice.*"

There is a good lesson contained in the following remark:—"Upon the whole I am much disposed to like the world as I find it, and to doubt my own judgment as to what would mend it. I see so much wisdom, as to what I understand of its creation and government, that I suspect equal wisdom may be in what I do not understand."

The advantages to be derived from an enemy are thus set forth:—"I do not wonder at the behavior you mention of Dr. S. towards me, for I have long since known him thoroughly. I made that man my enemy, by doing him too much kindness. 'Tis the honestest way of acquiring an enemy. And since it is convenient to have at least one enemy, who, by his readiness to revile one on all occasions, may make one careful of one's conduct, I shall keep him an enemy for that purpose; and shall observe your good mother's advice, never again to receive him as a friend."

The true philosopher and Christian appear in this extract:—"As to the reports you mention, that are spread to my disadvantage, I give myself as little concern about them as possible. I have often met with such treatment from people, that I was all the while endeavoring to serve. At other times I have been extolled extravagantly where I had little or no merit. These are the operations of nature. It sometimes is cloudy, it rains, it hails; again it is clear and pleasant, and the sun shines on us. Take one thing with another, and the world is a pretty good sort of a world, and 'tis our duty to make the best of it, and be thankful. One's true happiness depends more upon one's own judgment of one's self, or a consciousness of rectitude in action and intention, and the approbation of those few, who judge impartially, than upon the applause of the unthinking, undiscerning multitude, who are apt to cry *Hosanna* to day, and to morrow, *Crucify him.*"

The observation in the following paragraph on the abuse of reason is particularly good:—

"All the way to Dover we were furnished with post chaises, hung so as to lean forward, the top coming down over one's eyes, like a hood, as if to prevent one's seeing the country; which being one of my great pleasures, I was engaged in perpetual disputes with the innkeepers, ostlers, and postilions, about getting the straps taken up a hole or two before, and let down as much behind, they insisting that the chaise leaning forward was an ease to the horses, and that the contrary would kill them. I suppose the chaise leaning forward looks to them like a willingness to go forward, and that its hanging back shows reluctance. They added other reasons, that were no reasons at all, and made me, as upon a hundred other occasions, almost wish that mankind had never been endowed with a reasoning faculty, since they know so little how to make use of it, and so often mislead themselves by it, and that they had been furnished with a good sensible instinct instead of it."

Addressing a young lady, he makes this excellent observation on enthusiasm:—"You ought not to wish yourself an enthusiast. They have, indeed, their imaginary satisfactions and pleasures, but these are often balanced by imaginary pains and mortification. You can determine to be a good girl, and thereby lay a solid foundation for your expected future happiness, without the enthusiasm that may perhaps be necessary to some others. As those beings, who have a good sensible instinct, have no need of reason, so those, who have reason to regulate their actions, have no occasion for enthusiasm.

SCRUTATOR.

(*To be Continued.*)

For the Advocate of Science.

AMERICAN SCIENCE AND LITERATURE.

In the last number of the Advocate your correspondent "Franklin" as an introductory to a very sensible essay, condemns me for the sentiments I have advanced in my strictures on American Science and Literature. The cause of his complaint appears to be,—not that those sentiments are adverse to the truth, but that they are *too true* to be tolerated by the body of society, or to be palatable to the younger portions of it.

Of all objections this appears to me the strangest. In some particular cases, indeed, I do not deny but it may be very proper and even necessary to repress a knowledge of the truth; but where the interest, the welfare, and I might almost say the existence of society is involved, the simple fact of the unwillingness of a large portion of it to hear the truth, so far from furnishing a reason why it should *not* be told, affords a powerful argument in favor of the necessity of making it known.

Man has been very correctly called the creature of habit. Let him be confirmed in a bad one, and provided he is not utterly destitute of all moral sensibility, it will be really galling to tell him of his depravity; yet it is the only way you can possibly hope to reform, and in doing this you merely tell him the truth. But I will not here stop to enter into a disquisition on the propriety of telling the truth on all occasions, but will review the subject as it is now before us. More fully to accomplish the object, I invite the attention of "Franklin" to a survey of society generations ago, when the human mind was more like a territory, inhabited by all the wild things you can think of, than a cultivated field, where the useful flourished, and not the vile. If he is familiar with the history of the dark ages, he knows what despotism prevailed, over the minds as well as over the actions of men: that it was a day when they could not speak what they really thought and believed, without well established fear of being severely punished for their rashness. But in due course of time, a different prospect was opened to the view. A light came in upon the world, which it had not seen for upwards of a thousand years. It caused ignorance to withdraw from the kingdoms of which she had so long been absolute mistress, and superstition to follow in her rear. This was the light of reason and genuine philosophy. How glorious was the reformation it wrought in its course, and the effects of that reformation, how happy and invaluable! To its influence does the world owe its present greatness, and left without it, soon again would it relapse into its former dark and fearful state. But how did it accomplish this reformation? By the very means which "Franklin" objects to: by disseminating a knowledge of the true condition of the world, without regard to popular opinion or popular sanction. Had it waited for the coöperation of these, the universe might still have been enveloped in worse than Egyptian darkness. But its promoters were bold and fearless. Their energetic measures they roused the spirit of the people to a consciousness of their degraded state For their important services to mankind, they were rewarded as all reformers were ages after, by being made to feel the scourging rod of persecution.

Hundreds of years have passed by since the revival of literature. And how much better has the world grown? Let "Franklin" step into the presence of a fashionable company, and he will find out. He will discover they can talk fluently of their dear Cynthias and Evelines and Romanzos and Bulwer knows what all, but ask them a few questions respecting our ancient and modern worthies. Mention the name of Kepler; they will think you are a sober countryman, who knows more of facts than of fashions: yet Kepler was a great man, and though he had some foolish notions, he was of more use to the world than Scott, the opinion of the many notwithstanding. Speak of the learned Professor Porson; though he was the best Greek scholar in England, they never heard of him. Tell them of Kirk White; they will quote his poetry, but of his philosophy and learning, they know nothing. The same with Sydenham, Rousseau, and Ferguson. They were all great men, whose sterling virtues demands a tribute from the present and future generations, but for which we may almost seek in vain.

But let us come nearer home. Some of the proudest ornaments of our country are comparatively unknown. Morris, Wilson, Fulton, Monroe and Audubon, who do we hear speak of them? The statesman, the philosopher, and the naturalist know them; but who else? Do all those who are at this moment enjoying the benefit of their toil and discoveries, render to their virtues the meed of praise and gratitude? They do not. Their heads are filled with quotations from Scott, Moore, Byron, Bulwer, *Willis*, and a host of others, the most of whom have prostituted their talents to the most ignoble and criminal purposes,—that of poisoning the intellect of their fellow creatures. While these men are receiving from the whole world, extensive patronage and unbounded praise, those who are the genuine philanthropists of the age, the pillars of our literature, and the promoters of our sciences, are left to indifference and obscurity. This has been the case with all we have mentioned. Kepler had to strive against poverty, from the beginning to the end of his career. With all the knowledge which Professor Porson possessed, he could not make a living. Kirk White, possessing a fund of philosophy and science which few of his years have ever attained, fell on the very verge of manhood, with a heart, "pregnant with celestial fire," broken by neglect and poverty. Sydenham had learning and science, but he died in prison, since he could not pay for a few scanty meals! Rousseau died in poverty, though while an apprentice and journeyman printer he made himself master of six languages. Ferguson was poor, but the interest of a few of his friends raised him from a state of indigence to one of comfort. The life of Robert Morris needs no eulogium. His countrymen permitted him to close his useful career within the darkened walls of a prison. Fulton done much for the world, but the world did little for him: in the noble monuments of his genius may we see the benefits he conferred on his race, and in many has sympathy taken her station, asking for "gratitude to the heirs of Fulton." Wilson died as he lived, the child of penury. Science was poor; she could not reward him for his services, and the world would not. Munroe offered himself up on the altar of his country: while he could he served her, and having passed his three score and tenth year, he died—a bankrupt. Audubon is yet living; we cannot say what will be his future destiny, but the beginning of his career has not been marked by that patronage from his countrymen, which would give ease and comfort to declining years

These are a few of the many instances on record, by which we learn the highest mental attainments are insufficient to insure to their possessors a pecuniary emolument sufficient to the demands of life. To this unhappy state of affairs there must be a cause: and that cause is developed in the fact that their services, as philanthropists and historians of nature, are not duly appreciated by the world. And why are they not appreciated?

Because they are unknown. Most of those who present themselves to the public as intellectual caterers, are inadequate to the task. They mistake or disregard the real wants of those for whom they have to provide, and feed them with trash. Thus the public taste becomes depraved, and unconsciously so. To reform it is a desideratum.

If this reformation is not to be accomplished by telling the truth, what method will "Franklin" suggest to promote it? Is genius still doomed to toil without reward, and honest worth to live neglected and obscure, with scarce a friend to plead its suffering cause? Are the petty and venal writers of the age, to bear the palm of honor from those whom virtue has trained in her ways. and science has taught her mysteries? It cannot be: Justice must administer her decrees to all; to the good will she give renown; to the wise power, and with the mantle of oblivion will she cover the unworthy and the vile. W.

MISCELLANIES.

1. *The Gymnosophistæ, or naked philosophers.*—This was a class of philosophers who inhabited India, and among their most remarkable characteristics were those of going naked, and subjecting themselves to the inclemencies of the season. For thirty-seven years they exposed themselves to the heat of the sun and the coldness of the night. They were often seen in the fields fixing their eyes full upon the disk of the sun, from the time of its rising to that of its setting. Sometimes they stood whole days upon one foot in burning sand, without moving or showing any concern for what surrounded them. The conqueror Alexander visited them, and saw one ascend a burning pile with firmness and unconcern to avoid the infirmities of old age, and stand upright and unmoved on one leg, while the flames surrounded him on every side. But it is said by some that the gymnosophists enjoy the benefit of the sun's rays in winter, and in summer pass their time in cool and moist places under large trees.

2. *Architecture of birds.*—There are few spectacles of this sort more admirable than one which I have often witnessed. The bank swallows of the Ohio and Mississippi valley scoop hundreds of little circular chambers from the hard and chalky banks of the rivers, always so chosen as that portions of rock, or of the solid bank, just over their little municipal establishment, and defend in from rains and storms as a roof. Such are their social instincts, that, where circumstances admit, they seem to prefer attaching their habitations to those of men. I have noted two of these cities. In one, they were sheltered under the protecting roof of a naturalist, who cherished them. In another, they were settled on the south wall of an arsenal, and have continued to return to that place for a great number of years in succession. While recently surveying one, which contained some hundreds of habitations, I was informed that they had reared the greater part of this city in a single day; and it could not have contained less than as many hundred pounds of clay as there were families, all cemented firmly to the brick wall. The habitations were built in parallel curves, leaving streets between them. Nothing could exceed the neatness and exactness of the arch, that was turned over them. They darted backwards and forwards into a hole, that seemed scarcely large enough to admit their bodies, with the rapidity of lightning. Each one invariably entered its own home, and all seemed quietness and peace.

What I most admired was, that under the shed of the naturalist, conscious that they needed no protection from rain, none of their habitations were provided with arches; while on the naked and unsheltered wall of the arsenal, each one was so secured. Unhappily, instinct, as well as reason, is sometimes a fault. The last time I saw this city of swallows was after a great southern rain; for which, being at that season unusual, they seemed not to have been prepared. The clay had been softened, and whole portions of their city inundated and washed down. Hundreds of the young perished; and their parents, as they darted backward and forward over the ruins, uttered a sharp note of wailing, like the survivors of an inundated city.—*Flint's Lectures.*

3. *Incubation of birds.*—Scarcely are the nests completed, when the females begin to lay. These little beings, before so flighty, inconstant, and vivid, become staid and faithful to their new charge. The females sing not; for in doing it, they would indicate the locality of their nests, and attract pursuit. But the male places himself on a neighboring tree, too far from her mate to expose her to danger by his song; and there he soothes her maternal constancy with the sweetest symphony which his organs can utter.—*Ib.*

4. *Fossil remains.*—The bones of a large animal—probably the mammoth—have been discovered near the river Don, in Upper Canada. They were embedded six feet deep in clay. The weight of a single tooth is 3½ pounds, and the other relics are of a size to correspond.

5. *Salt Spring.*—A valuable salt spring has been discovered by boring, near Pittsburgh, on the opposite side of the Monongahela river. The depth reached by this process was 627 feet, and the stream of salt water rises to a height of 30 feet above the level of the earth, and at the rate of 7000 gallons in 24 hours, of strength sufficient to make 12 or 15 barrels of salt.

6. *Important discovery in science.*—We understand that Mr. Sturgeon who first produced the electric spark from a magnet, and thus proved the great affinity, if not the identity, of electricity and magnetism, has just had his labors crowned with another brilliant discovery—the decomposition of water by magnetism.

7. *Remarkable Occurrence.*—On Friday last the 16th inst. while the workmen were employed in levelling the rail road in this town over a piece of low spongy ground, a short distance south of Market street, between Mulberry street and the river, they discovered a break or crack in the road which they had previously levelled. Shortly after an opening presented itself and the earth began to cave in and sink out of sight. Several loads of dirt were thrown in—this also disappeared along with the ground which continued to cave in on every side, until the opening extended about sixty feet east and west, and one hundred and fifty north and south. As the earth disappeared, a body of water presented itself and rose towards the surface. Several thousand loads of dirt have been thrown in, a great portion of which has sunk away, nobody knows where. The hole is now partly filled up on the north side, but a considerable space still remains open where it first appeared. The depth or extent of this cavern has not yet been ascertained. Whilst the work of filling up was in progress, it was discovered that the level ground on the east side, covered with stumps and roots of trees about 60 feet by 100, was rising up and forming a hill; it has now risen several feet in the centre near the hole, and slopes off gradually in other directions. Large cracks are to be seen in different parts of this raised ground.

These are the facts; but whether it be a bottomless subterranean pond of water, or a bed of quicksand, or some other mysterious agent which sucks in and devours such vast quantities of earth, we must leave to the decision of the more learned advocates of Mr. Symmes' theory.—*Newark, (N. J.) Eagle.*

AGENTS.

ADAMS, Mass.—*P. Briggs*, P. M.
BRISTOL, Pa.—*Anthony Swain.*
FRANKFORD. Pa.—*John D. Griscom.*
MOUNT HOLLY, N. J.—*Samuel Bullock.*
MORRISVILLE P. O. Pa.—*Hector C. Ivins.*
POTTSVILLE, Pa.—*Elihu Pedrick.*
BALTIMORE, Md.—*Joseph Earnest, No.* 40 *S. Eutaw Street.*
ALEXANDRIA, D. C.—*Henry Stabler.*
WASHINGTON, D. C.—*William C. Ellison.*
BYBERRY, Pa.—*Isaac Comly, Jr.*
DARBY, Pa.—*John Sellers Jr.*
WEST CHESTER, Pa.—*Samuel Paynter*, Bookseller.
VALLEY FORGE, Pa.—*Maurice Richardson.*
MARCUS HOOK, Pa.—*Robert R. Dutton.*
LOWER GREENWICH, N. J.—*William Griscom, Jr.*

☞ Responsible agents are entitled to every sixth copy

ADVERTISEMENT.

☞ Books, Pamphlets, Handbills, Cards, Apothecaries' Labels, and every description of PRINTING, neatly and promptly executed, on the most reasonable terms, at the office of "THE ADVOCATE OF SCIENCE," S. W. corner of Sixth and Cherry streets, Philadelphia.